1997
Executive Research Project

The First Warfighter Rapid Acquisition Process (WRAP) Program

Jed A. Sheehan
Lieutenant Colonel
U.S. Army

Faculty Research Advisor
Colonel Stephen L. Thacher, USA

The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-5062

DISCLAIMER

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY N/A	3. DISTRIBUTION / AVAILABILITY OF REPORT Distribution Statement A: Approved for Public Release: distribution is unlimited.
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE N/A	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NDU-ICAF-97	5. MONITORING ORGANIZATION REPORT NUMBER(S) N/A
6a. NAME OF PERFORMING ORGANIZATION Industrial College of the Armed Forces 6b. OFFICE SYMBOL (If applicable) ICAF-FA	7a. NAME OF MONITORING ORGANIZATION National Defense University
6c. ADDRESS (City, State, and ZIP Code) Fort McNair Washington, D.C. 20319-6000	7b. ADDRESS (City, State, and ZIP Code) NDU-LD-SCH Ft. McNair Washington, D.C. 20319-6000
8a. NAME OF FUNDING / SPONSORING ORGANIZATION N/A 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N/A
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)

The First Warfighter Rapid Acquisition Process (WRAP) Program

12. PERSONAL AUTHOR(S)

LTC Ted A. Sheehan, USA

13a. TYPE OF REPORT Research	13b. TIME COVERED FROM Aug 96 TO Apr 97	14. DATE OF REPORT (Year, Month, Day) April 97	15. PAGE COUNT 53

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

See Attached

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL Susan Lemke	22b. TELEPHONE (Include Area Code) (202) 22c. OFFICE SYMBOL NDU-LD-SCH

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE

UNCLASSIFIED

THE FIRST WARFIGHTER RAPID ACQUISITION PROCESS (WRAP) PROGRAM

BRADLEY-LINEBACKER

Lieutenant Colonel
Jed A. Sheehan
U.S. Army

Faculty Research Advisor
COL Steve Thacher

The Industrial College of the Armed Forces
National Defense University
Fort McNair, Washington, D.C. 20319-5062

Introduction

The first Army Warfighting Rapid Acquisition Process (WRAP) programs, the Bradley STINGER Fighting Vehicle - Enhanced (BSFV-E) and the Advanced Precision Aerial Delivery System (APADS), were approved by the WRAP Council on 26 January 1995. The WRAP has been touted as a revolutionary acquisition plan that may be the model for Army acquisition programs in the future. Brigadier General Harry Gatanas, Assistant Deputy for Systems Management, has said: "I believe that once we get this system nailed down, it will become the template for the way we procure all systems."[i]

WRAP is a methodology that takes advantage of acquisition reform initiatives that have been enacted by Congress and adopted by the services. It is designed to put systems and technology into the Army inventory and the hands of the Warfighter in a fraction of the time compared with the traditional acquisition process. WRAP is the method the Army will use to bring many of the Task Force XXI initiatives into the inventory.[ii]

This paper will examine the WRAP process by looking at the first iteration of the WRAP process and conducting a case study of the Bradley STINGER Fighting Vehicle - Enhanced (BSFV-E), now renamed the Bradley-Linebacker Air Defense System, the first WRAP program to complete the process and be fielded to the force. Special emphasis will be placed on innovations and lessons learned as these may materially benefit the next round of WRAP programs.

Background

The WRAP has its roots in the Army Battlefield Laboratories (Battle Labs) Program. This program was established by the Army Training and Doctrine Command (TRADOC) in May 1992

and was designated a National Reinvention Program of the President's National Performance Review. "Battle Labs are a new way of defining requirements and developing battlefield capabilities... The labs look for ways to increase lethality, survivability and tempo of operations and horizontally integrate them across the entire combined arms and services team."[iii]

There are six Battle Labs established at TRADOC posts across the United States. They are:

1. The Early Entry Lethality and Survivability (EELS) Battle Lab located at Fort Monroe, VA;
2. The Mounted Battle Space (MBS) Battle Lab at Fort Knox, KY;
3. The Dismounted Battle Space (DBS) Battle Lab at Fort Benning, GA;
4. The Depth and Simultaneous Attack (D&SA) Battle Lab at Fort Sill, OK;
5. The Battle Command (BC) Battle Lab with elements at Fort Leavenworth, KS, Fort Gordon, GA, and Fort Huachuca, AZ;
6. The Combat Service Support (CSS) Battle Lab at Fort Lee, VA.

The Battle Labs conduct Advanced Warfighting Experiments (AWE) using a combination of constructive, virtual and live simulations with actual field soldiers and units in tactical scenarios. The Battle Labs had been performing AWE's since 1992, but no method had been developed to capitalize on successful experiments and actually field new capabilities.

The Rapid Acquisition Tiger Team

In May 1994, TRADOC CG GEN Franks asked Army Chief of Staff, GEN Sullivan, to help find a way to rapidly acquire and field Battle Lab successes.[iv] As a result, Mr. Gilbert Decker, the Army Acquisition Executive, and LTG Forster (ASARDA) formed the Rapid Acquisition Tiger Team (RATT) to develop an acquisition process to field these successes to the force. The team

was headed by Dr. Herb Fallin (SARD-ZD) and consisted of high-level representatives from the different Army staff agencies and commands involved in the acquisition process.

TRADOC nominated four programs from different Battle Labs as possible WRAP candidates. These programs had been the subject of successful AWE's and were deemed to be the best opportunities to use as the basis for the new acquisition process. These four programs were: the Bradley STINGER Fighting Vehicle - Enhanced (BSFV-E), a Bradley Fighting Vehicle with a STINGER missile launcher and fire control integrated into the turret; the Advanced Precision Aerial Delivery System (APADS), a guided parafoil delivery system; the Triband Satellite Communications Terminal (STAR-T), and the Under Armor Auxiliary Power Unit (UAAPU) for the M-1 Abrams tank.

The Tiger Team worked on developing the rapid acquisition process throughout June and July capitalizing on new ideas emerging in acquisition reform initiatives. According to a 22 October Memorandum from LTG Forster, the team looked at OSD's Advanced Concept Technology Demonstrations, Army Materiel Command's Warfighting Rapid Acquisition Program, the Horizontal Technology Integration (HTI) of 2nd Generation Forward-Looking Infrared (FLIR), the Army Digitization Office, and the Army Science Board's two step process for HTI. In addition, the team had to take into account the constraints and challenges of the Army's existing Modernization Program, prioritization and resourcing processes, and current acquisition laws and policies. The Tiger Team developed what was called the Integrated Battle Lab Acquisition Process (Annex A).

The process then envisioned began with the Battle Labs identifying and focusing on requirements and opportunities for new materiel and technology. The Battle Lab establishes

Battle Tech Teams headed by an Advanced Concept Manager to develop and coordinate a Battle Lab Experiment Plan (BLEP). CG, TRADOC then approves the plan and the AWE would be conducted by the respective Battle Lab. Successful AWE's would be identified that were worth pursuing, the BLEP would be updated and a requirements document would be prepared. Program Managers (PM's) would become involved in the process when the PM initiated a technology project for Battle Lab experimentation, or at the first indication the Battle Lab project would impact a PM managed system.[v] According to the process as originally envisioned, CG TRADOC would approve the need, endorse the plan and propose bill-payers to provide funding for the program. The WRAP Council would then review the requirements, commit resources, approve the strategy, designate the Program Executive Officer/Program Manager (PEO/PM) and, finally, assign a milestone entry point for the program.

In June 1994, Program Management Offices (PMO's) were asked to develop acquisition strategies to rapidly field the four candidate systems. Strategies were developed in coordination with the respective Battle Lab for each system and these strategies were briefed by PMO representatives at a meeting of the Tiger Team in early August, 1994. Some of the basic questions that needed to be answered was who would manage the programs if they were approved and how would they be funded? Another basic question was what exactly was meant by rapid acquisition? Was it three years or two? Could some of the programs be done as Non-Developmental Items (NDI)? Were approved Operational Requirements Documents necessary for rapid acquisition? The program teams were asked to further develop their plans and brief again at the next Tiger Team meeting in October. The Tiger Team continued to refine the rapid acquisition process.

In mid-September 1994, CG, TRADOC approved and signed TRADOC Regulation 11-1, The Battlefield Laboratory Program, that formally established Battle Lab procedures. The Battle Lab process would be tested over the next two years culminating in Task Force XXI. The exercise would test a total of 72 initiatives including 41 prototypes, 14 battlefield concepts and 17 pieces of somewhat proven equipment.[vi] Significantly, TRADOC Regulation 11-1 did not contain any guidance on transitioning Battle Lab successes into acquisition programs. The Tiger Team's rapid acquisition process would be not be codified until 11 April 1996 in the Policy for Warfighting Rapid Acquisition Program, which was approved by the Army Acquisition Executive, Mr. Gilbert F. Decker and the Vice Chief of Staff, GEN Ronald H. Griffith. The first four candidates were the test bed for the development of this process.

The Rapid Acquisition Tiger Team met again on 14 October 1994. The process was taking shape with the basic approach laid out for the candidate program teams. The process established at that meeting follows.

1. A Battle Technology Team (BTT) would be formed for each candidate. The BTT would be orchestrated by the Chief Battle Lab to orchestrate the AWE's through TRADOC, an Advanced Concept Manager (ACM) would be chosen by AMC to act as project manager through rapid acquisition and team members would include testers, cost analysts, and contracting personnel with matrix support if needed.

A single management plan would be prepared by the BTT using a streamlined acquisition approach. This approach would include:

- Best business practices, products, processes and standards
- Commercial and performance specifications

- Distributed Interactive Simulation, if appropriate
- Best value contracting.

2. The primary document for each program would be the Battle Lab Experiment Plan (BLEP). It would be based on the ACTD Management Plan and was to be written at the executive level using informal language and would be less than 25 pages. It must contain the vital objectives of the program and include the TRADOC-approved requirement (ORD). The technical approach was to be described with critical events, transition options, participants, program schedule and funding requirements included.

3. The WRAP Council, the final decision-making body, was formalized with the following membership: DUSA(OR) , ASA(FM), PA&E, TRADOC (DCS CD), AMC (DCS RDE), OPTEC (CDR), ADCSLOG, ADCSPER, and VDISC4.

4. Responsibilities were established including:

a. TRADOC would endorse the process, request Advanced Concept Managers (ACM), and prepare tailored plans for each candidate;

b. AMC would endorse the process, designate the ACM's and support preparation of the candidate plans;

c. DCSOPS would support the process and establish requirements guidance. DCSOPS was also asked to determine the validity of the requirements and priorities and resources available;

d. The Tiger Team would tailor the ACTD guidelines for preparation of the BLEP's, execute the decision process for the candidates and lead the Army through the implementation of the process and protect and evolve the process.

The participants left the 14 October meeting with a firm direction of march, but not with all the details of the process worked out.

Some of the questions from the previous Tiger Team meeting had been answered. The documentation requirements were firming up. The 25 page BLEP would be the basic document along with a requirements document, an abbreviated ORD (three pages). ACM's would be chosen as PM's and the basic structure of the BTT's was in place. Some important questions remained to be answered, however. Funding of the programs was still unknown. Agencies with personnel working on the plans for the candidate programs were using organizational overhead to pay for the effort. PEO's and PM's were asked in the ASARDA memorandum of 25 October to "identify potential funding strategies that might support high priority projects in FY95 and FY96 where reprogramming and new starts would be very difficult to achieve."

The different BTT's went to work developing the specifics of potential acquisition strategies and making the rounds to the various agencies to determine issues and incorporate ideas and requirements into the various BLEP's. This continued into January 1995 when the first WRAP ASARC was held where the first four candidates were considered for final approval on 26 January 1995. When the briefings had been completed and the issues resolved, two of the four programs had been approved: The Bradley STINGER Fighting Vehicle - Enhanced (BSFV-E) and the Advanced Precision Aerial Delivery System (APADS). The following is a case study of one of those programs, the BSFV-E, renamed the Bradley-Linebacker Air Defense System.

The Bradley-Linebacker Air Defense System - The First Successful WRAP Program

Case Study

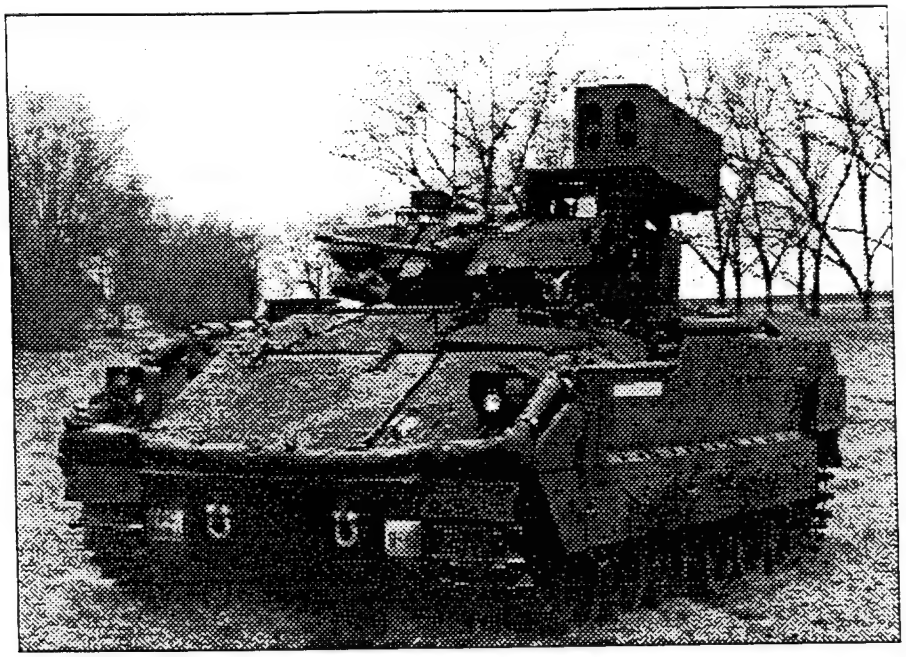


Figure 1 - The Bradley-Linebacker Air Defense System

The Bradley-Linebacker program actually began with the cancellation of the Air Defense Anti-Tank System (ADATS) in January, 1992. ADATS was the latest in a series of false starts on the Army's part to field a heavy Air Defense system to protect the maneuver force. First Mauler, then Sergeant York, and finally ADATS were all developed but, for various reasons, never fielded. Over a period of approximately 25 years, the Army had spent $8 billion with nothing to show for it. Army Air Defense was in trouble. The Vulcan Air Defense System, fielded in the 1960's as an interim system, was at the end of its useful life and was being withdrawn from service. The Army desperately needed an air defense system to fill the forward, heavy requirement.

The interim plan was to put a STINGER Team in the back of a Bradley Fighting Vehicle, thus becoming the Bradley STINGER Fighting Vehicle (BSFV). This was relatively easy to

accomplish because, with the drawdown of forces after Desert Storm, there were Bradley vehicles available. The resulting system, however, had many drawbacks.

First and foremost, the BSFV, in order to engage an air threat, had to first stop and deploy the STINGER Team. The STINGER gunner must stand in the open to fire his missile. Once fired, a smoke trail led directly back to his position. Survivability was, therefore, a very real concern. Further, when the BSFV stopped to deploy its team, the supported force, an armored company team, would continue moving. This meant the air defenders fell behind and could not provide the air defense coverage that was needed.

There were other shortcomings with the BSFV. The Forward Area Air Defense Command, Control Communications and Intelligence System (FAADC3I) was installed in the turret of the BSFV. This system is an early warning and cueing system that provides the air situation over a digital data link. Unfortunately, this system remained in the turret when the team deployed and was not available to the team. The STINGER also had no night-fighting capability in its man-portable role. It was obvious that something better was needed. It was so obvious that even Congress realized it.

In the Appropriations Committee Report 102-1015 (November 1992), Congress directed the Army to look at ways to improve on the BSFV.

> "With the demise of the ADATS, the committee is concerned as to how the Army intends to fill its mobile air defense needs. The conference agreement provides $7.75 million to restructure the growth options of BSFV to immediately review the cost and operational effectiveness of mounting existing air defense turrets on the Bradley Fighting Vehicle. The conference directs the Army to provide a report on cost and operational effectiveness of

turret integrations into the Army's future mobile air defense plans no later than May 31, 1993."

Product Manager, Ground-to-Air Missile Systems (PM-GTAM), an office under Project Manager, Forward Area Air Defense (PM-FAAD), was tasked with conducting what would be known as the Turret Study.

At the same time the Air Defense Lab at the Air Defense School, Fort Bliss, a cell of the Mounted Battle Space (MBS) Battle Lab, began a series of cooperative demonstrations with industry to come up with BSFV enhancements to improve the capabilities of the BSFV. These two efforts were conducted in close cooperation between the Air Defense Lab and PM-GTAM. They would lead directly to the BSFV-E (E for enhanced) concept.

The Turret Study

PM-GTAM designed a study that would provide an effective examination of cost effective solutions for upgrading the BSFV. System level evaluation criteria were developed in conjunction with the Air Defense School. These criteria stated that the turrets examined had to be an existing turret, that it fire STINGER missiles and that a gun/missile mix had to be maintained. A market survey was conducted and three turrets were chosen as potential candidates.

The three turrets included an upgraded Avenger turret, built by Boeing; a turret similar to the Marine Corps LAV-AD turret, built by Martin-Marietta; and a prototype turret similar to the Bradley A3 turret under development by FMC (Figure 2).

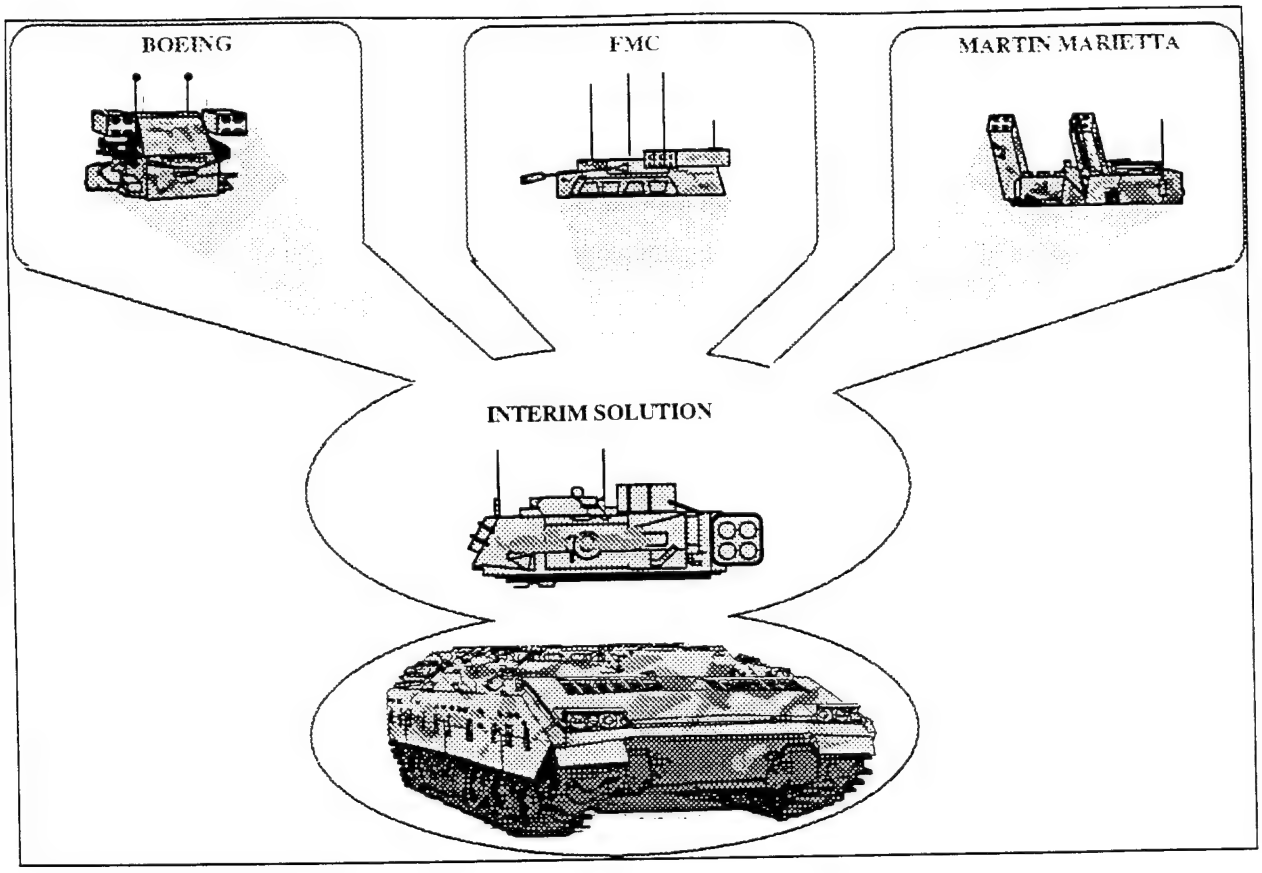


Figure 2 - Turret Study Methodology

The funds appropriated for the Turret Study ($7.5M) would not allow actual prototypes to be built and tested to determine the most effective. PM-GTAM worked with the Army's Missile Command (MICOM) to determine a method that would provide the answer within the small budget. The answer was the Virtual Prototype Simulator (VPS), a man-in-the-loop, reconfigurable, virtual reality simulator. This allowed MICOM to build each prototype system in the virtual world and test them on a virtual battlefield for less than 10% of the cost of live system testing. Actual Air Defense soldiers from the Air Defense School operated the systems providing feedback based on their field experience.

The VPS consisted of computer work stations that were driven by high grade processors utilizing approved models (Figure 3, upper left). These models ensured that the simulated terrain, threat, and prototype systems appeared and acted as closely as possible to the real thing. Later, the VPS would be incorporated into a full scale turret mockup (Figure3, upper right), but for the turret study, only actual hand controls were provided. Each of the three companies providing turrets were contracted to provide the data needed to simulate their systems. They were also required to certify that the VPS modeled each system faithfully.

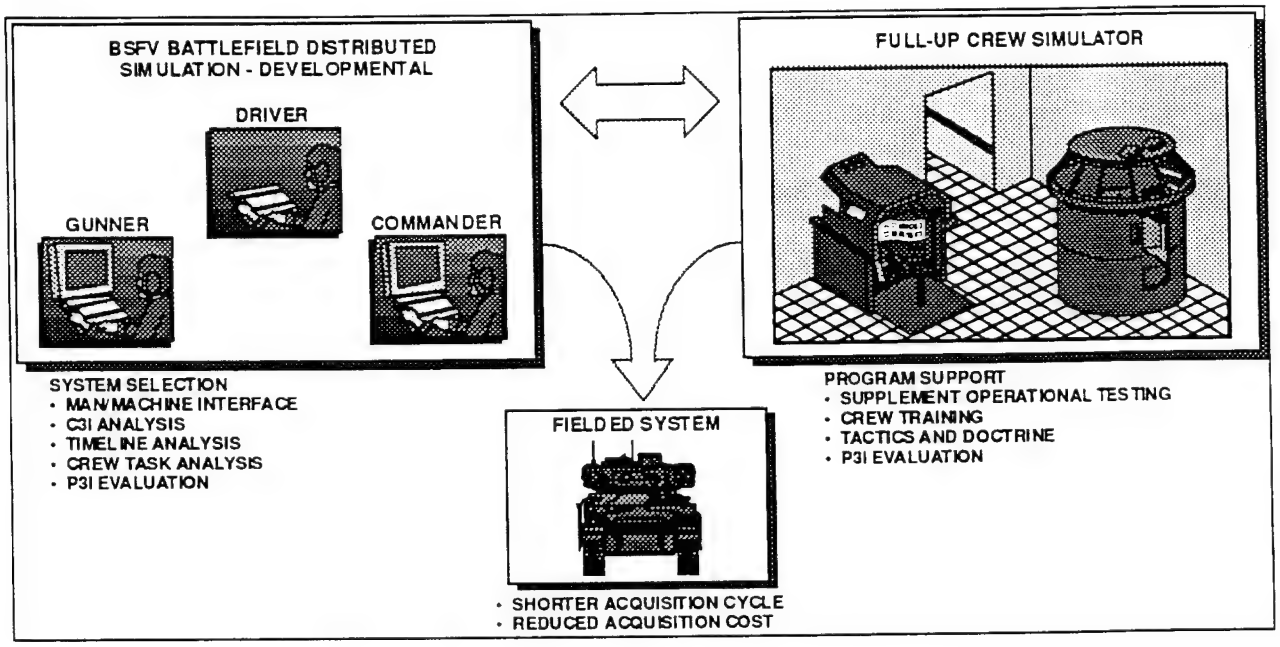


Figure 3 - Virtual Prototype Simulator Evolution

Near the end of the Turret Study, the Air Defense School asked PM-GTAM to include an interim solution which consisted of minimal upgrades to the standard Bradley Fighting Vehicle turret. These upgrades included only the STINGER launcher and minimal fire control and relied on basic BFV sighting systems. This was modeled and tested by soldiers from the school and compared with the results of testing on the other three turrets. The results were surprising. The interim solution with minimal upgrades provided over 80% of the operational effectiveness as the

best of the other three turrets and at only 25% of the cost. The best value was the low cost solution.

Battle Lab Experiments

The Battle Lab at Fort Bliss began developing the concept of an upgraded BSFV in September 1992. Working with PM-FAAD and PM-GTAM, the Battle Lab contracted with FMC and Hughes Corporations to develop upgrades to the basic BSFV for Battle Lab experiments. The first experiment, conducted in December 1992, was a simple test firing of a STINGER missile from the turret of a Bradley Fighting Vehicle. This proved that the missile could actually be aimed and fired safely from the turret. The next experiment in February 1993 brought target alerting and cueing information into the turret to determine if the crew chief and gunner could find a aerial target from inside the turret. This task, because of the limited external visibility provided by the Bradley's vision blocks, is analogous to finding a target in the sky while looking through a soda straw. Both experiments were successful.

In August of 1993, a fully integrated system was tested. This system integrated a four-missile, Standard Vehicle Mounted Launcher (SVML) from the Avenger Air Defense System, along with the fire control system, into the Bradley turret. Components of the FAADC3I system, including a hand-held computer terminal, provided the crew with digital alerting and cueing information which thus allowed the crew to find and engage a target while remaining buttoned-up within the turret. An improved hatch with larger vision blocks was incorporated into the turret to provide improved external vision for the crew chief. Finally, a prototype Integrated Sight Unit (ISU) with laser range finder, dual displays, auto track capability and integral Forward Looking Infrared (FLIR) and Television displays was also included in the experimental vehicle.

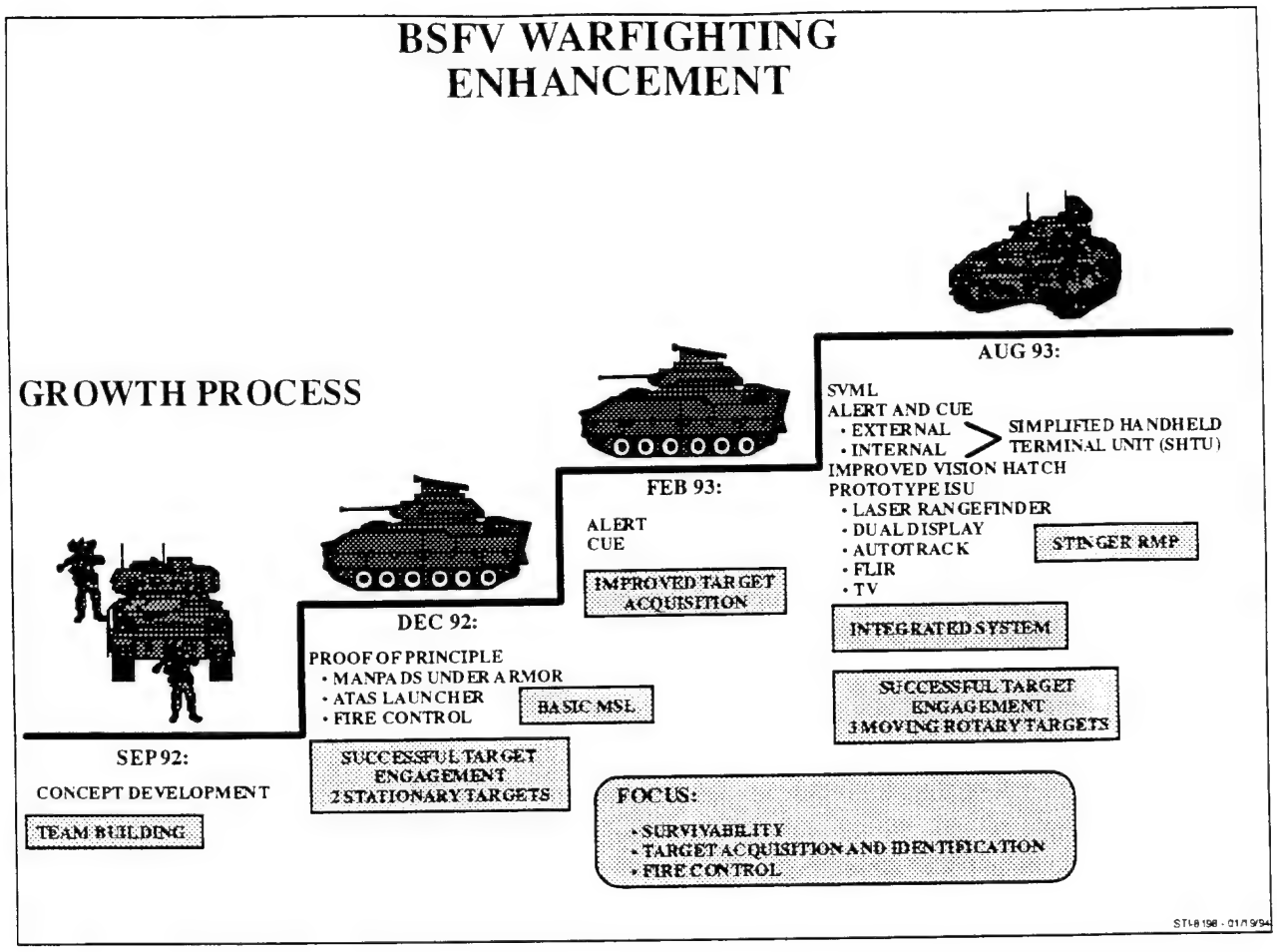


Figure 4 - Battle Lab Experiments

Extensive testing was conducted at Fort Bliss, TX, included the successful engagement of three rotary wing targets. This experiment, along with the Turret Study, successfully proved that the concept of using the basic Bradley vehicle with minimal upgrades was an acceptable solution to the Heavy Air Defense requirement and was possible at a very modest cost. This concept was called the Bradley STINGER Fighting Vehicle-Enhanced (BSFV-E).

The WRAP Phase

In June 1994, CG, TRADOC nominated the BSFV-E as a candidate for the new rapid acquisition process developed by the WRAP Tiger Team. The Tiger Team asked PM-GTAM to

provide a briefing on the status of the BSFV-E concept and potential strategy for transitioning this Battle Lab success to a rapid acquisition program.

The BSFV-E concept was at a perfect transition point for selection as a WRAP program. Battle Lab experiments had been successfully completed and the Turret Study was near completion. The Air Defense School had developed a draft set of requirements (Annex A) and was searching for the right method to develop and field a system based on the BSFV-E concept. The briefing to the Tiger Team laid out different acquisition strategies along with a rough cost estimate. The Air Defense School felt that $27 million dollars would be available from various reprogramming sources to fund the effort. PM-GTAM was asked to design a program that would field Force Package 1 Divisions with BSFV-E fire units while remaining within that cost ceiling. This would necessitate a minimalist approach of providing only the basic required capability in order to keep costs down. The Turret Study had shown that minimal upgrades was the cost effective solution and supported the Air Defense School in deciding it could live with a bare-bones system.

The concept for the BSFV-E system had taken shape based on the school's requirements, minimal expected funding, and the leveraging of systems already in production or soon to be fielded. The BSFV-E system would be an integration of four kits: The BSFV-E kit, the FAADC3I kit, the Bradley Operation Desert Storm (ODS) kit; and the Force-on-Force Trainer kit. Another kit would be integrated for use during Task Force XXI, but would not be fielded with the operational systems.

The BSFV-E kit replaced the TOW launcher on basic Bradley with the STINGER launcher with the capability to fire the new STINGER-RMP missile. Also included in the kit was an

elevation modification to allow the launcher to elevate high enough to engage aircraft, a cue for the gunner to indicate the azimuth of the target, a reticle in the gunner's sight to let him know what the missile is locked on, and the mounting cables, brackets, and hardware. The missile and launcher were already in the inventory and could be utilized off-the -shelf. The rest of the BSFV-E kit would be developmental, but not entail a large effort.

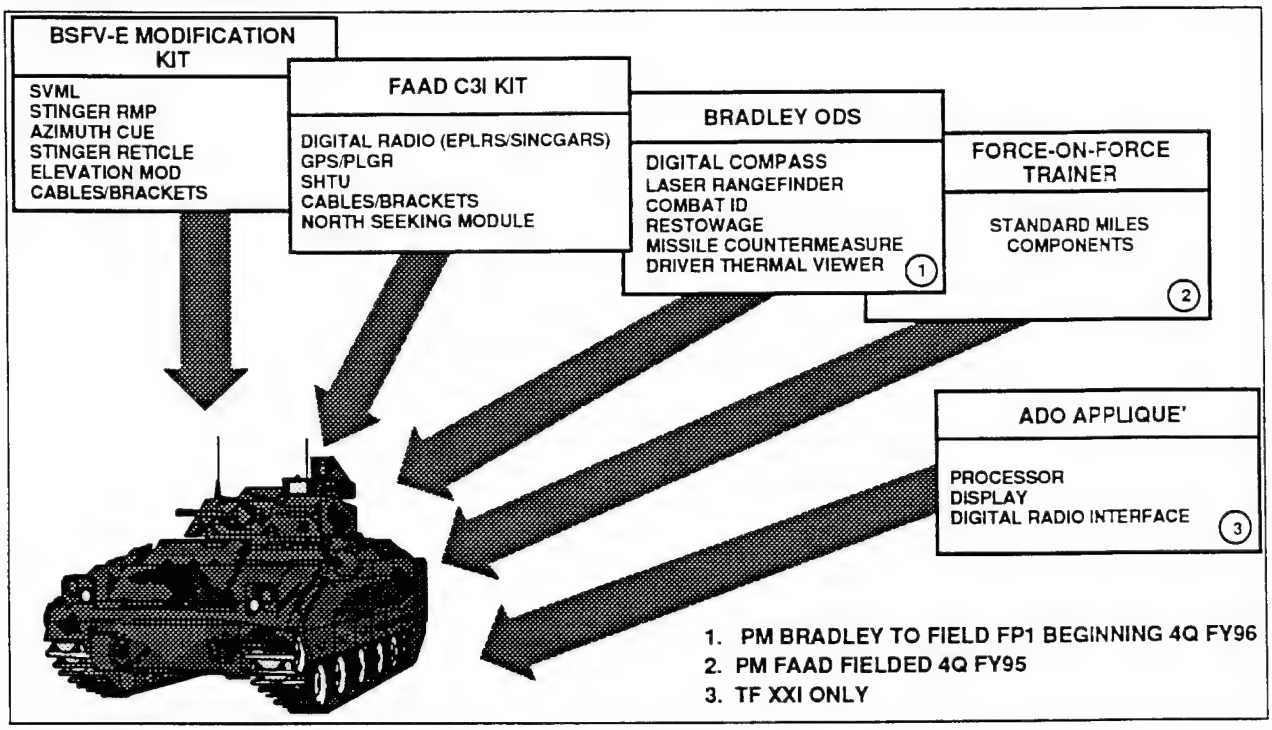


Figure 5 - BSFV-E System Concept

The FAADC3I kit included digital radios, GPS receiver, the Simplified Hand-held Terminal Unit (SHTU), a small computer terminal for displaying alerting and cueing information to the crew, a north seeking module to let the crew know what direction the turret was pointing at all times, and mounting hardware. This kit was in the process of being fielded to the Bradley's in the air defense units by another PMO, Project Manager-Air Defense Command and Control Systems.

The Bradley ODS kits consisted of upgrades that Desert Storm showed to be required. This kit included a number of vehicle upgrades but the additions that the air defense system would

leverage were the laser range finder and digital compass. These components were in development by Project Manager - Bradley Fighting Vehicle Systems (PM-BFVS) and were scheduled for fielding beginning in late FY96. The basic Bradley Fighting Vehicles were already fielded to the Air Defense units and came "free of charge."

The Force-on-Force Trainer consisted of standard Multiple Integrated Laser Engagement System (MILES) components adapted for use with the BSFV-E. This kit was for training only and allowed the system to "shoot down" MILES-equipped training aircraft during training exercises. This system was required for use at the National Training Center where TFXXI would take place.

The Army Digitization Office (ADO) applique' kit consisted of more digital radios and a computer. Managed and fielded by the ADO, this kit would be used only during the TFXXI exercise as part of the digitization effort which TFXXI would test.

The BSFV-E concept of a system of integrated kits allowed PM-GTAM to leverage billions of dollars in research and development already spent developing the systems contained in these kits. The remaining development and integration to produce an effective air defense system would be PM-GTAM's responsibility.

Acquisition Strategy

The PM-GTAM team worked to develop the acquisition strategy over the next five months and several strategies were explored before the final decision. These included:

- sole source contracting to the contractor team that built the prototype for the Air Defense Lab;

- building the test prototypes in the government lab at MICOM and then contracting out for the production units;
- conducting either a full and open or a limited competition for the entire effort.

The strategy chosen was in line with the concept of a system of kits: Non-Developmental Item (NDI) Integration. Decision authority would be at the lowest level consist with acquisition regulations: Acquisition Category IV (ACAT IV) and would be managed at the PEO/PM level with decision authority resting with the PEO. This level of management provided a flexible, fast-reacting management capability by removing the service staff and OSD staff from the decision-making process. Milestone decisions would not have to go through the lengthy and bureaucratic Defense Acquisition Board (DAB) or Army System Acquisition Review Council (ASARC) processes.

The program would be streamlined in every possible way to ensure rapid acquisition became a reality. Program documentation was streamlined to consist of as few documents as the law would allow. The 25 page BLEP and a three page Abbreviated ORD would suffice for program approval by the WRAP Council. Testing would be minimized by further utilizing the VPS in conducting both Developmental and Operational testing in as many instances as possible and also in developing the training package for fielding. The source selection process, usually a year-long process, would be completed in three months.

The contract would be awarded based on a source selection limited to those contractors in the Turret Study. The proposals would be based on performance specifications which told the contractors what the system was to do rather than how to build it. The contract was Firm, Fixed Price, there would be no negotiations, no BAFO (Best and Final Offer) and was based on best

value, not lowest bidder. The Virtual Prototype Simulator would be used to assist the evaluation team in the selection process by simulating each proposed system and allowing soldiers to test the systems in virtual reality as part of the evaluation.

The Air Defense School believed that the system must be fielded in time to participate in TFXXI or there would be no program. Fielding to the first air defense battery must take place not later than 1 June 1996 to meet the deadline. This meant the entire program must be completed in less than two years.

The acquisition strategy was briefed to the PEO, Mr. George G. Williams, in a decision briefing on 29 November 1994 (figure 6). The cost of the program up to and including fielding of the first air defense battery was estimated to be $13.38 million. The PEO had achieved significant cost savings in other programs and had determined that reprogramming of these funds could pay for this first phase of the program. This decision was in response to LTG Forster's memorandum of 25 October 1994 which asked PEO's to identify potential funding strategies.[vii] Production money totaling an additional $14.52 million, however, would have to come from Department of the Army (DA) in the Program Objective Memorandum (POM) process. The total cost to field TFXXI and Force Package 1 (68 fire units) was estimated at $27.9 million. The decision made by the PEO was to start working on the documentation needed to initiate source selection immediately after approval of the program by the WRAP Council. That decision would be made 26 January 1995. The goal was to issue the Request for Proposals (RFP) immediately upon WRAP approval.

Logistics

The concept for logistics support was to leverage already-fielded systems. Contractor support would be provided for a period of 29 months. This was due to the standard length of time required to provision a newly fielded system by the Army's logistics infrastructure. Rapid acquisition or not, the logistics system could not or would not change. A period of 29 months was required no matter what. This was true even though the extensive leveraging of fielded

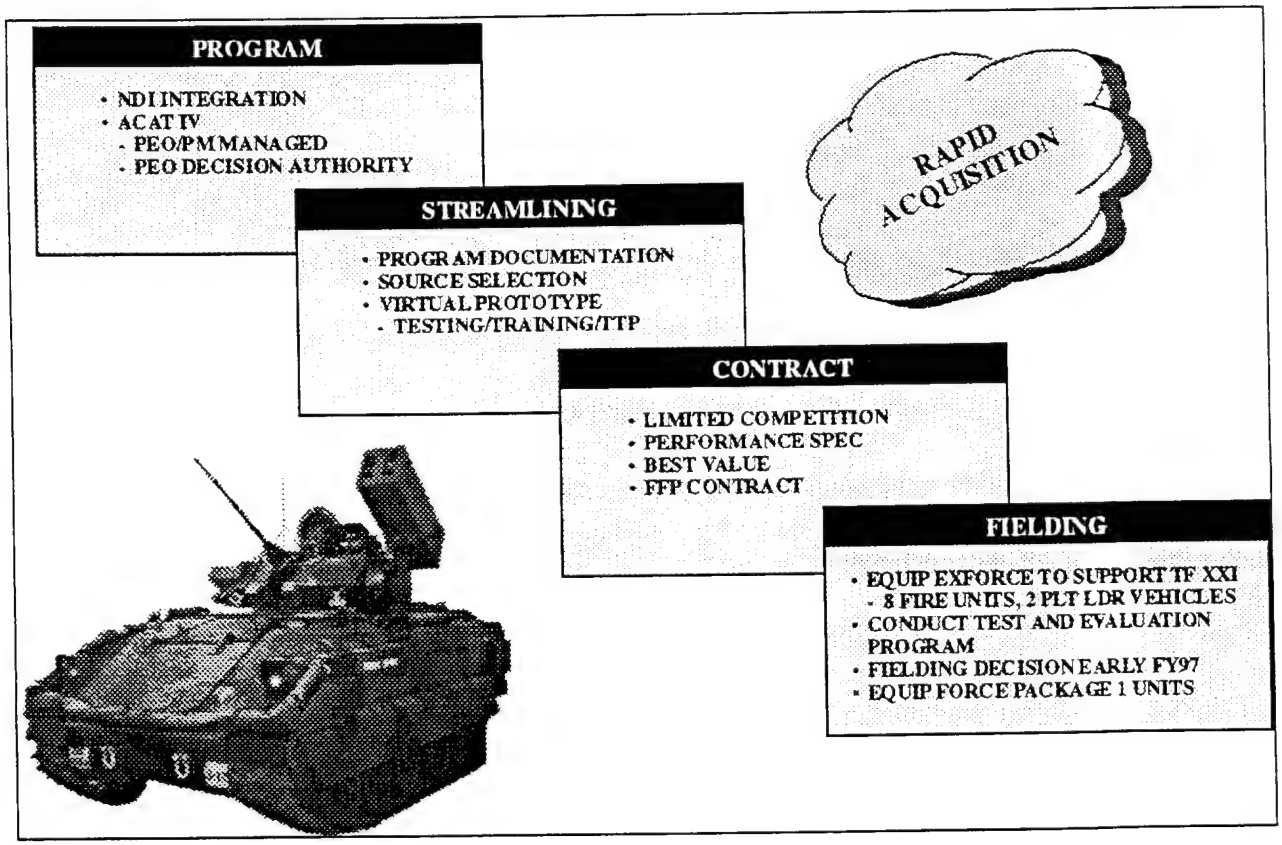


Figure 6 - BSFV-E Acquisition Strategy

systems resulted in only eight new stock numbers required to support the BSFV-E. The total parts count for a BSFV-E modification kit totaled 208, of which 200 were already in the supply system. Another aspect of the logistics plan was to utilize contractor depot support, at least until the density of fielded systems made it cost effective to provide depot support capability in a

a government depot. With only 68 fire units planned for fielding to field Force Package 1 units, it did not make sense to buy the support package for a government depot.

The Documentation Process

Immediately after the decision briefing was completed, PM-GTAM began selecting personnel for the team that would put prepare the documentation required for the source selection process. The two main requirements for inclusion in the team were professional competence and a desire to do things differently. The catch phrase for the program became "not business as usual" and the desire to try to change the acquisition process was the attitude the PM was looking for in potential team members.

The team at its maximum strength numbered approximately 25 personnel. There were members from each functional area within the PMO as well as members drawn from the Air Defense School, the PMO's responsible for the different kits, the test and evaluation community, and the contracting office. The team started work in December and grew in January 1995 as the documentation started taking shape.

The BLEP and ORD were completed early in December 1994 as these were the documents that would be required for the WRAP Council. Next were the documents that would allow release of the RFP: the Acquisition Strategy Report, the Congressional Business Daily (CBD) announcement, the performance specification and the draft RFP package itself. The goal was to release the RFP as soon as possible after WRAP Council approval of the program. The draft RFP was released on 25 January, prior to the WRAP Council. The program was approved by the council on 26 January and the official RFP was released on 9 February. Contractors were given just over a month to prepare their proposals. A Pre-solicitation Conference was held to answer

questions and to explain the rapid acquisition nature of the BSFV-E program. The requirement for no negotiations and no BAFO was also specifically and repeatedly emphasized.

The WRAP Council

Prior to the first WRAP Council, the PM-GTAM team worked to build consensus within the acquisition community for support of the program and, specifically, for support of the streamlined acquisition strategy. Briefings were provided to the test community to gain support for the test strategy. Numerous briefings were provided to DA staff representatives. Issues were raised and solutions agreed upon. These were incorporated into the planning and ensured that all the issues were put to rest prior to the WRAP Council.

The WRAP Council was held 26 January 1995, almost two years to the day after the cancellation of the ADATS program. To show how important the BSFV-E program was to the Air Defense Branch, MG James Cravens, the Commandant of the Air Defense School, personally briefed the requirements for the system. The PEO, Mr. George Williams, also participated in the council. This show of support helped convince the council of the urgent need for the system and the BSFV-E was approved for program start and would enter the acquisition process at the Milestone III, Low Rate Initial Production (LRIP). Funding for phase 1 would be reprogrammed from other systems in PEO-Tactical Missiles and the BSFV-E would compete for production funding for Force Package 1 (FP1) units (60 systems) in the POM process. Phase 1, fielding of 8 LRIP units to an air defense battery for TFXXI, must be completed in less than 18 months (Annex B - Program Schedule).

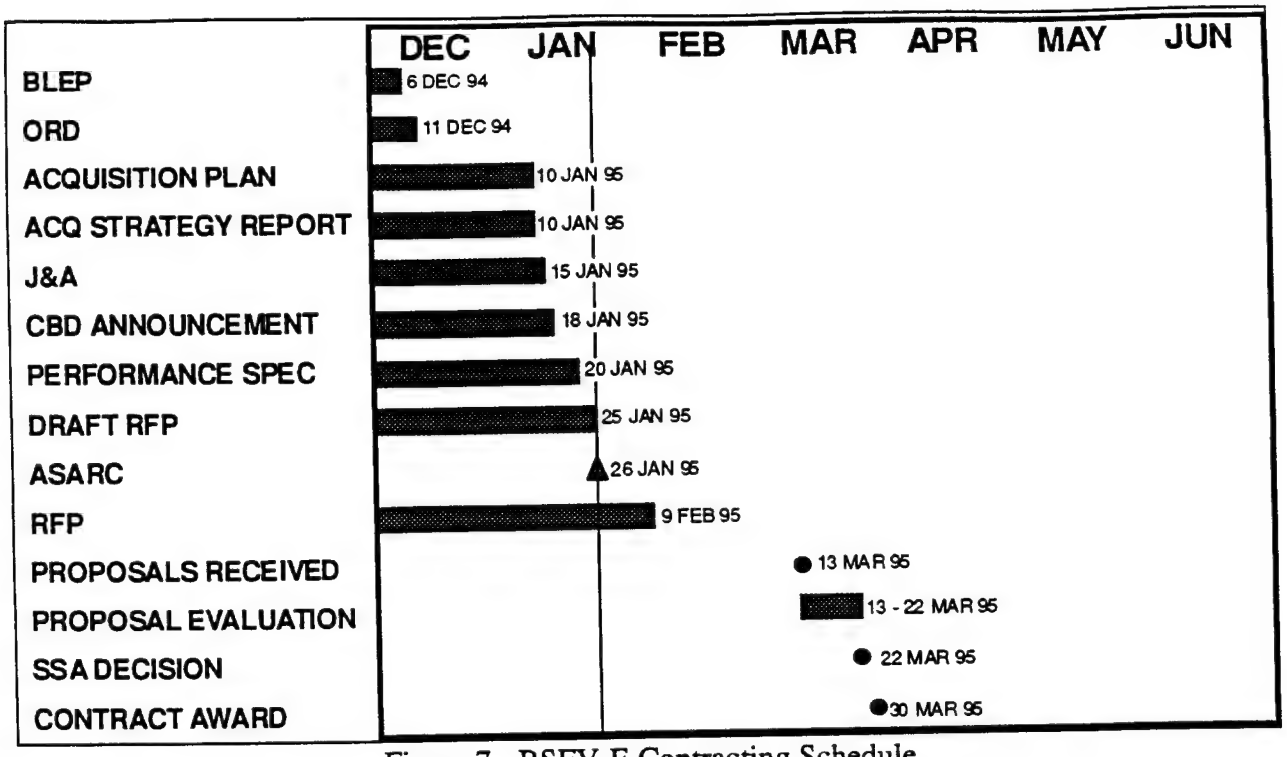


Figure 7 - BSFV-E Contracting Schedule

The Source Selection Process

The source selection team was formed with personnel drawn from those who had written the program documentation and RFP. This allowed the team to start work immediately rather than spend time familiarizing themselves with the program. Two proposals were received from the four contractors eligible to bid in the limited competition. The proposals were required to be provided in electronic medium and each team member was provided with their own computer work station. Also required from the bidders was the data needed to model each proposal in the VPS. This effort had to begin immediately to allow the VPS to participate in the source selection.

The RFP was written to reflect the minimum operational characteristics in the ORD. The required capabilities became the baseline proposal required from each contractor. The desired operational characteristics were then required to be broken out separately and set up as options with separate prices. The PM was allowed to execute individual options if funding was available

and to make trades between cost and additional operational capability. This also provided an incentive for the bidders to compete in price even in the desired operational requirements. The cost for the entire system, including options, was lower than anyone's expectations and was almost 20% lower than the Government's cost estimate (GCS)(Table 1).

	Basic System	With All Options	GCE
TFXXI (8 Systems)	$7.031 Million	8.511	8.358
Force Package 1 (60)	10.359	11.582	16.325
Total Contractor Cost	17.390	20.093	24.683

Table 1 - Boeing's proposal and government cost estimate for contractor effort (does not include cost of GFE, test and evaluation, program office, etc.)

The VPS modeling and testing effort was completed in time to validate the source selection team's conclusions as to the differences between the two proposals. A clear difference in performance existed and the VPS testing proved what the team had inferred from their study of the proposals. The VPS had proven its' worth in the source selection, however, the VPS proposal models were not certified by the bidding contractors. This almost caused a protest, a delay that would have made participation in TFXXI impossible.

The source selection team worked almost non-stop from 13 March, when the proposals were received, to 22 March when the Source Selection Authority (SSA) selected the winning proposal. The SSA had been delegated by CG, MICOM to the contracting officer level. This allowed a timely selection and eliminated another layer of staff bureaucracy. The contract was awarded to the Boeing Company on 30 March 1995, barely two months after the WRAP Council approved the program.

Program Execution

Startup

The members of the Source Selection Team, after contract award, returned to their own organizations where they continued to work BSFV-E issues part time. The GTAM product office managed the program with only 12 full-time employees. Matrix support was provided by PM-FAAD, of which PM-GTAM was a part, on an as-needed basis. The driving factor to limit the full-time employees was the minimal funding available to manage the program. Twelve full-time employees meant that each area of program management was covered by a single individual. Contract management, budget management, configuration management, system engineering, test and evaluation, system support, and product assurance were all one deep. The remainder of the twelve included the Product Manager and Deputy Product Manager, and two members of MICOM's Systems Simulations Directorate to manage the VPS effort. This minimal number of program office personnel was possible because the Firm, Fixed Price contract did not require the intensive management of a Cost-Plus contract.

The Boeing proposal included a no-cost option that would accelerate the work effort and program schedule by three months. The PMO immediately exercised this option to ensure the TFXXI fire units would be fielded by the 1 June 1996 deadline for inclusion in the AWE. Also exercised were the options for all desired operational capabilities. The Boeing cost for these capabilities was far lower than had been anticipated and was only available at the start of the program. Design considerations required that they be included from the start or the cost to go back and make engineering changes to include them would be far higher. Also, if the options

were not included during government testing, the test program would have to be repeated at great cost.

The additional funding to exercise the options was provided by PEO-Tactical Missiles. The additional cost, $1.48 million (Table 1), was well worth the additional capability it provided. The additional capability, when modeled and tested by the VPS, provided equal to or greater performance than the higher cost new turrets in the Turret Study for drastically lower cost.

Government/Contractor Integrated Product Teams (IPT's)

The use of Government/Contractor Integrated Product Teams (IPT's) was required by the contract and was utilized from program start with weekly meetings. The fact that the Boeing factory was co-located with the PMO in Huntsville, AL, facilitated full integration and attendance at IPT meetings. The government personnel became partners with the Boeing team and resulted in extremely close cooperation throughout the program. A true government/contractor team resulted which facilitated early identification and resolution of problems. This was extremely important in maintaining the very aggressive program schedule. Although there was give and take within the details of the program schedule, the eight fire units for TFXXI were fielded with full support and with New Equipment Training completed by 1 June 1996.

Government Furnished Equipment (GFE)

The greatest challenge facing the BSFV-E Program in the first few months of the contract was providing the required GFE to Boeing. GFE included the Bradley vehicle itself, prototype hardware for the ODS upgrades, Enhanced Position and Locating Reporting System (EPLRS) digital radios and mounting kits, FAADC3I hardware, and Global Positioning System (GPS) hardware. Further, the MILES Kit adaptation effort, handled through STRICOM, was not placed

on contract until almost a year after Boeing's effort began. The weakness of BSFV-E Rapid Acquisition Program was that it still had to interface with the rest of the acquisition community which was not attuned to rapid acquisition.

Acquiring enough GFE for one BSFV-E system was a challenge, the eight fire units for TFXXI was almost an impossible task. Only high-level support for the first WRAP allowed the delivery of GFE, sometimes at the very last possible moment.

Fire Unit #1, a pre-production test unit, was completed in September 1995, barely six months after contract award. Testing started in October 1995.

The Test Program

The primary consideration in planning the BSFV-E test program was to minimize unnecessary, redundant testing. Because the BSFV-E incorporated so many off-the-shelf components, minimal testing was planned and coordinated with the Army's developmental evaluator, Army Materiel Systems Analysis Activity (AMSAA), and the operational evaluator, Operational Evaluation Command (OEC). The VPS would be utilized to further cut test requirements on expensive test ranges, saving a huge amount of time and money. The VPS would also be used to develop tactics, crew procedures and crew training, allowing this work to start before building the first test article saving an enormous amount of schedule time. Both evaluators agreed with the strategy, including use of the VPS. OEC agreed to accredit the VPS for use as an accepted Army model and simulation for use in operational testing and evaluation.

The Bradley vehicle had been thoroughly tested and the Bradley PMO was conducting a full test and evaluation program for the ODS upgrades. The STINGER missile and launcher were already tested and fielded and FAADC3I was in the fielding process. EPLRS and GPS were also

in production and the MILES kit was an adaptation of existing components. The majority of the test program, therefore, consisted of qualification of certain components in a tracked vehicle environment and the integration of the various components into the BSFV-E system.

The test program consisted of three phases (Figure 9). Contractor Technical Evaluation, Government Developmental Testing and Operational Testing. Qualification of components on the Bradley was conducted during both contractor technical evaluation and government developmental testing. This consisted of vibration and shock testing of components to ensure they would survive the harsh tracked vehicle environment and retain their reliability. Testing included the STINGER missile itself which had not been qualified on the Bradley and was considered the highest program risk area. Extensive testing was conducted to ensure the missiles were safe for use on the Bradley.

The Contractor Technical Evaluation was conducted at Redstone Arsenal, only a few miles from the Boeing plant. The integration and operation of the BSFV-E system was tested at government test facilities from October 1995 to May 1996 utilizing soldiers from the Air Defense School to assist in the effort. Government participation and access to data allowed use of the test data in the developmental evaluation. This minimized test costs by negating the usual requirement for the government to repeat contractor testing under government control. Government participation and validation of this testing satisfied AMSAA's requirement for test data.

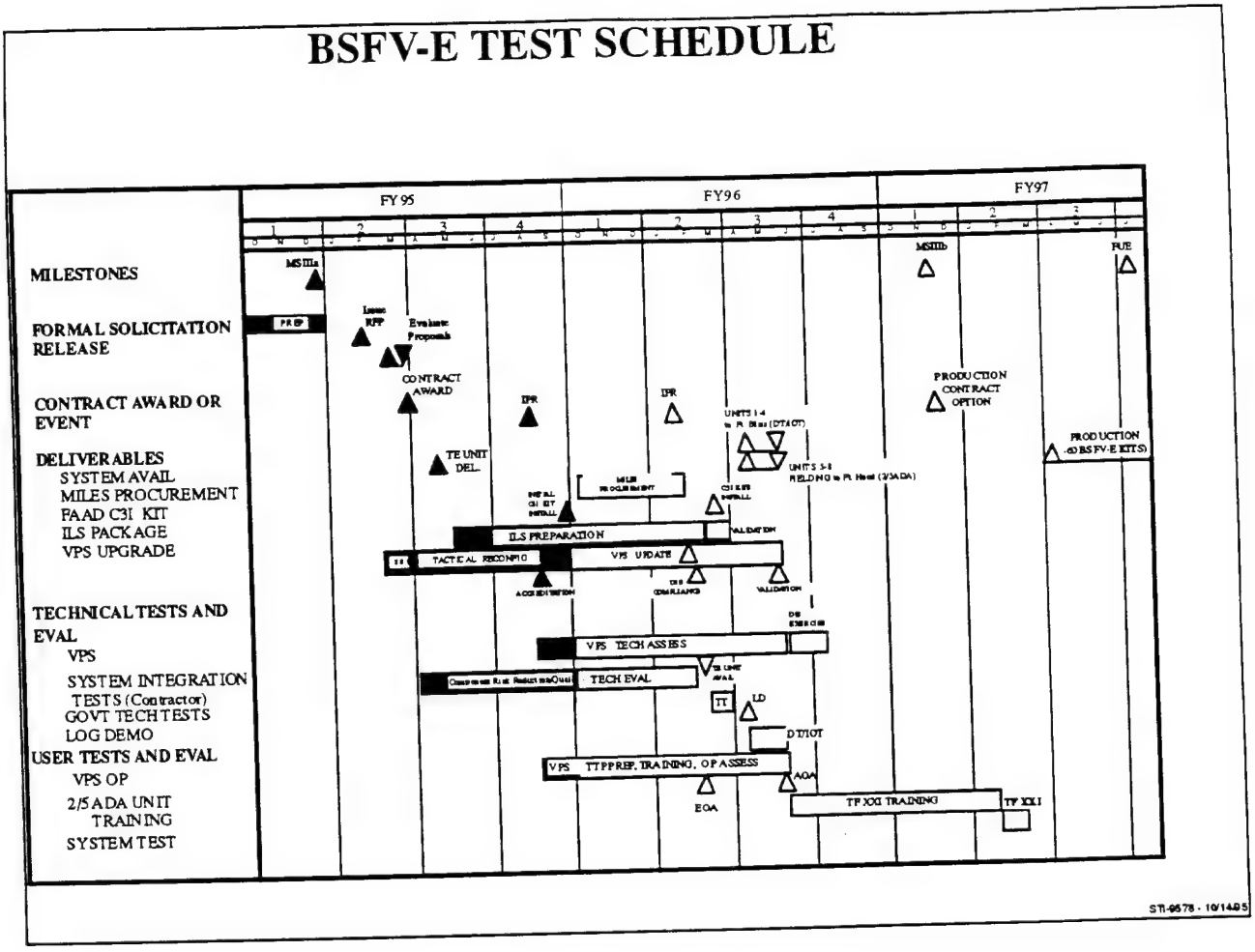


Figure 8 - BSFV-E Test Schedule

The Developmental Testing was conducted at government facilities on Redstone Arsenal, AL and consisted of tracking and engagement tests against aerial targets. Originally scheduled for March through April 1996, but difficulties caused delays. The Bradley vehicle was not designed for the tight tolerances needed to accurately point the turret using remote radar data fed over the FAADC3I system. This necessitated the incorporation of a software fix to compensate for the errors inherent in the Bradley turret slip rings and, in turn, required a repeat of the Software Validation Test to ensure the software was safe prior to putting the system in the hands of

soldiers. The delay required that Boeing begin building the eight TFXXI fire units before developmental testing was completed, adding to risk and increasing management requirements. This severely taxed the small Product Office team. Test firings of environmentally conditioned missiles were conducted at Eglin Air Force Base, FL to complete the process of qualification of the missile on the tracked vehicle.

Operational Testing was conducted at Fort Bliss, TX from late April through May after fielding to the 2nd Battalion, 5th Air Defense Artillery from Fort Hood. The operational test, a full Initial Operational Test and Evaluation (IOTE), consisted of a platoon of four BSFV-E fire units supporting a combined arms company team which included Bradley Fighting Vehicles and M1 Abrams tanks. Offensive and defensive operations were conducted over a 10 day period with actual aerial threats flying attack missions. Weather conditions at Fort Bliss were hot and dry with temperatures exceeding 100°F.

Production, Modification and Fielding

The original plan for production of the eight TFXXI fire units called for shipping the modification kits to Fort Hood, TX where 2/5 ADA was stationed. The Army had set up a large shop facility for modifying all TFXXI systems. Coordination visits and the experience of the Avenger fielding team convinced PMO personnel that the modifications could not be successfully accomplished at Fort Hood. The facilities did not have critical shop tools like an overhead crane or a hydraulic press that were an absolute requirement. Attempting the modifications at Fort Hood would end in failure. The PMO, together with Boeing, decided that an alternative plan was required. The Ordnance School at Redstone Arsenal offered the use of a maintenance training facility for the modification of the fire units. This building was a modern facility with all required

shop tools and, ironically, had originally been built for the Sgt. York program. It also was located within miles of the Boeing plant so any re-work or problems could be easily coordinated. Fort Hood and the Air Defense School were convinced of the need and the eight Bradley's were shipped from Fort Hood in March 1996. The modification effort was more difficult than anticipated as variations in Bradley fire control components in the eight vehicles caused delays as new components were located and replaced. Additionally, the PMO decided that New Equipment Training would be more efficiently conducted at Redstone as the fire units were completed. The schedule was so tight that fire units were literally driven by the crews from the modification facility to the training area for NET. Figure 9 shows how tight the schedule was and how any delay would cause slippage throughout every aspect of the program. Not only was NET training required for the BSFV-E kit, but for every other kit that made up the system. The modification effort and NET was finally completed within schedule, but it entailed going to near 24-hour operations, including weekends. The first four fire units were shipped directly to Fort Bliss just in time for the start of the IOTE, while the remaining fire units were shipped directly to Fort Hood.

The IOTE was successfully completed 25 May 1996 and the fire units were shipped to Fort Hood for the start of TFXXI training. The assessment of the Operational Evaluators was that the BSFV-E performed its mission successfully. Very few aircraft managed to successfully penetrate the BSFV-E defense and, out of hundreds of opportunities, there was only one incidence of fratricide.

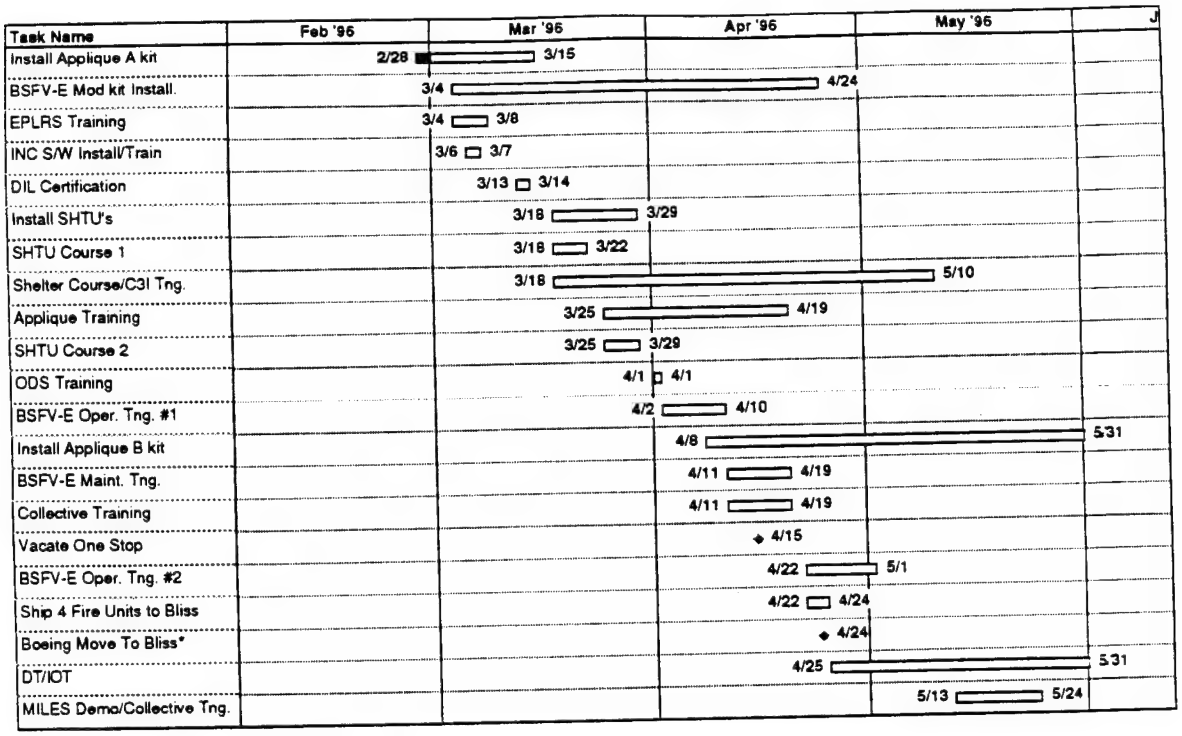


Figure 9 - Modification and NET schedule

The full battery of fire units was fielded, NET completed, and spares delivered prior to the 1 June 1996 TFXXI deadline. The first BSFV-E Air Defense Battery, now re-named Bradley-Linebacker, was in place, ready for the TFXXI AWE. The next hurdle would be the Milestone III, Full Production decision in November.

Milestone IIIb

The successful completion of the IOTE marked a transition point for the PMO. Management of the Linebacker program would become a big question mark in the coming months. PM-FAAD had given way to Product Manager STINGER as the Avenger system was transferred to MICOM management. PM-GTAM remained a sub-set of PM-STINGER until 1 July 1996 when PM-GTAM was deactivated as a Product Management Office. The Linebacker program was then transitioned to PM-STINGER and continued as one of a number of programs under that office.

Preparation for the MSIIIb decision also included the question of who would manage the program. PM-Bradley had supported the Rapid Acquisition concept but felt that the Bradley PMO was responsible for all Bradley variants. When the decision was made to install the modification kits on the Bradley production line in York, PA, it was natural that PM-Bradley would take more responsibility.

The 27 November 1996 MSIIIb decision briefing to the PEO was a joint conference with PEO-Tactical Missiles at Redstone Arsenal and PEO-Armored Systems Warfare at Warren. MI. Minimal new documentation was required as most documentation addressed shortcomings from the test program. The 11 page decision document was approved and the Bradley-Linebacker was ready to go into full production.

The contract for Boeing to produce 60 production systems was awarded on 14 April 1997 at Redstone Arsenal, just two years from the award of the original contract for eight LRIP systems. The BSFV-E concept had gone from a concept in June 1994 to a fielded system in full production in only 34 months.

Task Force XXI Results

The Task Force XXI AWE was conducted at the National Training Center, Fort Irwin, CA, in March 1997. The results showed the effectiveness of the Air Defense systems against the OPFOR air threat. In an information paper on TFXXI results,[viii] TRADOC states:

"To date this (ADA) architecture has brought great results for force protection of the Brigade. In the first three battles, the Task Force has shot down 12/16, 17/18, and 21/28 enemy aircraft. These results are well above average for a normal rotation. The systems in the ADA architecture are clear winners for Task Force XXI."

The Linebacker systems operated almost flawlessly with much better than anticipated effectiveness and reliability. In a true test of their effectiveness, the Linebacker systems showed that rapid acquisition and low cost can equal great combat capability.

Innovations

The Bradley-Linebacker program included numerous innovations and acquisition reform initiatives in accomplishing successful rapid acquisition. Following is a listing of those innovations.

Innovations During the studies and Battle Lab experimentation period:

(1) The cooperation and team efforts of the Air Defense School (user), PM-GTAM (materiel developer) and industry to develop the BSFV-E concept and prove its feasibility/affordability.

(2) Use of AWE to test concepts (i.e. NTC 94-07).

(3) Use of Virtual Reality technology in testing and refining concept.

(4) Rapid completion of Studies and Demo period (18 months) and low cost (approx. $10 Mil).

Innovations during the WRAP Process:

1. The WRAP process itself was an innovative process developed by The Tiger Team at DA (SARD) in cooperation with TRADOC to rapidly field Battle Lab successes.

2. Cut required documentation. The Battle Lab Experiment Plan (BLEP-25 pages) and Requirements Document (three page ORD) were the only documents required for the WRAP Council ASARC to provide program approval.

3. Concurrent development of the ORD and BLEP. The ORD was developed by the Directorate for Combat Development at the Air Defense School while the BLEP was developed by the PM with input from the Air Defense Lab. The BLEP was a blending of the TRADOC BLEP format

with the Acquisition Strategy Report (ASR) normally developed by the materiel developer. These two documents were jointly and concurrently developed by the user and materiel developer. This cooperation helped ensure a smooth transition from Battle Lab success to actual program.

4. Coordination with DA and entire acquisition community to ensure plans took into account requirements of test and evaluation, logistics, legal, and contracting. The advanced coordination allowed input to the rapid acquisition concept by all concerned organizations and allowed for an issue-free Wrap Council. This is the same principle as the Overarching IPT (OIPT) process.

5. Placed authority for program execution at lowest level allowable, PEO/PM managed, ACAT IV. Layers of bureaucracy that are normally involved in every decision were deleted allowing rapid decision making and quick execution.

6. Rapid processing at DA. The entire Tiger Team effort took only eight months.

7. Support and interest from the entire chain of command from DA on down. Perhaps the most important key to success, bureaucrats at all levels moved quickly to accomplish each and every task. BSFV-E, in effect, went to the top of everyone's priority list.

Innovations during the Contracting Period:

1. The PMO formed a team to work development of the RFP drawing heavily from PMO personnel. This allowed the personnel with the required experience and who would actually execute the program to write the RFP. Subject matter experts were drawn from the different communities as needed (i.e. user, logistics, other PM shops).

2. Use of Performance Specifications (nine pages) rather than the standard Military Specifications was the key to quick preparation of the RFP. The performance specification told the prospective

contractors how the system had to perform, not how to do it. The specification contained no Military Standards, instead Industry Standards were used.

3. CG, MICOM delegated source selection authority to the Contracting Officer, removing more layers of required approval and bureaucracy.

4. A Source Selection Team was formed to evaluate proposals rather than the traditional Source Selection Evaluation Board (SSEB). Personnel who wrote the RFP, and were therefore familiar with the requirements, were selected for this team. This cut the time normally needed to familiarize an SSEB.

5. No negotiations with contractors were held and no Best and Final Offer (BAFO) was asked for. This shortened the process and avoided leveling, a situation that negotiations can cause where all proposals begin to look alike. The potential for a protest was reduced.

6. A streamlined evaluation was planned to allow the proposals to be evaluated in two weeks.

7. Virtual Reality technology was used in the proposal evaluation to provide insights to performance. Key discriminators identified in the evaluation process were validated by the use of this technology. Use of virtual reality technology was possible due to the modeling work already completed during the Turret Study.

Innovations during the Test Program:

1. Use of Virtual Reality Simulator to minimize expensive testing on test ranges during both developmental and operational testing.

2. Government monitoring of contractor testing to enable utilization of contractor test data and to preclude repeating tests.

3. Extensive leveraging of developed system hardware and off-the -shelf components to minimize test requirements.

Innovations during program management:

1. Extremely small product management office (12 personnel) minimizing cost and maximizing flexibility and enabling rapid decision-making.

2. Use of Virtual Reality Simulator to develop Tactics, Training, and Procedures (TTP) and to train crews even before the first fire unit had been built.

3. Ability to quickly change the program plan and execute a new plan as in moving the modification of fire units and NET to Redstone Arsenal vice Fort Hood.

Lessons Learned

The lessons learned during the Bradley-Linebacker program will prove important if, as stated in the Acquisition Reform Reinvention Center Army Concept Paper:

> "The WRAP Process will be used for this Army XXI Acquisition Reform initiative to decide which unfunded emerging technologies and new starts should be financed and recommend the source of funds for such financing."[ix]

The experiences of the first WRAP program to go from concept to fielded system will provide a synopsis of how one program successfully transitioned in a rapid acquisition context.

The WRAP Process.

1. The BSFV-E was at a perfect transition point for nomination in the WRAP Process. The Air Defense Battle Lab had completed a series of successful experiments and the PM had nearly completed the Turret Study. The concept had been developed and a clear, cost-effective path had emerged. A PMO was in place with experienced personnel and, most importantly, the user

and materiel developer had developed a close working relationship. Future WRAP nominees must be at a point of development where they can be rapidly transitioned to an acquisition program.

2. The Advanced Concept Manager must be an acquisition professional, preferably a PM, and in a position to be fully supported by a PMO. WRAP approval should be the point where responsibility moves from a joint user-materiel developer effort to a PM-managed program.

3. The BLEP is not a good format for starting an acquisition. The BLEP format is intended for describing an AWE, not laying out an acquisition plan. The Acquisition Strategy (AS) and Acquisition Strategy Report (ASR) are suited to the purpose of laying out a program plan. They must be prepared anyway and the BLEP, in this case, was never again referred to after WRAP approval.

4. The streamlined documentation required for the WRAP was very successful. All personnel working on the documentation are taken out of some organization's overhead. Prior to WRAP approval, there is no funding available to do massive mounds of documents. The 25 page BLEP and three page Abbreviated ORD kept documentation, and the effort to prepare it, at a manageable level. This is a good reason to get rid of the BLEP format in favor of the AS and ASR. The AS and ASR must be completed by law - the BLEP is redundant and irrelevant. Further, the three page Abbreviated ORD was fully sufficient for the program. The full-length ORD, required prior to full production, added nothing to the program and should be dropped as a requirement.

5. Advanced coordination with <u>all</u> organizations involved in the acquisition community is required prior to the WRAP Council. This determines issues and potential problems with the

developing acquisition strategy. Failure to accomplish this coordination and failure to resolve issues will result in their being raised during the WRAP Council and may prevent WRAP approval.

6. Identification of funding at the PEO level increases the chance of WRAP Council approval. Competition at the DA level for scarce resources is intense and finding bill-payers is a tough action. If the PEO can identify a source of funds that can be re-programmed, it makes the approval easier. PEO-Tactical Missiles found funding from cost savings on other programs and this was an important reason for the WRAP approval. The establishment of a WRAP fund ($50 million in FY96) from which to fund WRAP programs will ease this problem. However, with 72 initiatives coming out of TFXXI, the competition for that pot of funding will still be intense.

7. The support of the user and the materiel developer at the WRAP Council is extremely important. The Commandant of the Air Defense School, MG James Cravens, and the PEO-Tactical Missiles, Mr. George Williams, both participated in the WRAP Council with MG Cravens actually giving the user's briefing. This support provided the high-level emphasis to impress the importance of the program on the WRAP Council.

Acquisition Strategy and Program Management

1. The WRAP process is an ideal vehicle for an NDI program or advanced technology insertion. The short development time (two years) in which to move from RDT&E funding to production using anticipated POM funding, works well for a program with little or no development required. A new start in which a major development effort is required would probably take longer.

2. Leveraging of research and development efforts, testing, fielded equipment and off-the -shelf components/hardware/software can cut costs immensely. Components already in the supply system are usually cheaper than a new build.

3. The use of performance specifications was very successful. Performance specs cut the requirement for oversight and lets the contractor concentrate on designing the system for its mission, not just to meet a milspec requirement. This is one of the truly successful acquisition reform initiatives.

4. The BSFV-E program was approved as an ACAT IV program with PEO decision authority at the lowest level possible. This cut layers of bureaucracy and contributed greatly to keeping the WRAP process real rapid acquisition.

5. The use of the virtual reality simulator enabled the modeling and testing of different proposals and capabilities quickly and cheaply. Soldiers in-the-loop provided feedback from years of operational experience and allowed insight into the cost effectiveness if various systems and capabilities. It provided test data without the expense of building systems and testing them on actual ranges, a very expensive undertaking. The ADATS "shoot-off" to down-select to a winning proposal cost $54 million; the Turret Study cost $7.5 million. The VPS also allowed the TTP to be developed prior to any hardware being built. During source selection it provided key insight into differences in proposals. A mistake was made in not having contractors certify the VPS model prior to its use in the source selection. This almost caused a protest by the losing contractor.

6. The use of government/contractor IPT's fostered teamwork rather than the usual we/they relationship. Early identification of issues and a team approach to problem-solving were key in the Linebacker program remaining on schedule and within budget.

7. The requirement to provide a final proposal up front with no negotiations and no BAFO enabled the source selection process to be completed in less than 3 months. The opportunity for each bidder to submit questions to the government assisted the contractor teams in understanding exactly what the government requirements were. This is usually part of the negotiation process and can take a year or more. The winning proposal became the contract further simplifying and speeding the contract award.

8. The use of a Firm, Fixed Price (FFP) contract simplified and reduced the management load on the PMO. Cost data was irrelevant. The contractor knew how much money was available and had to bring the program in for that price or not make a profit, or worse, lose money. This placed more risk on the contractor than a normal cost-plus contract. A FFP contract is very appropriate for a program in which the risks are known and in which there is very little development. Greater use should be made of FFP's in such cases.

9. Best value contracting allowed the source selection team to chose the best system for the money rather than locking the government into the low cost bid. Best value enabled the team to go with the proposal that provided the most cost-effective solution, even though it was more expensive. Best value turns out to be less expensive in the long run.

10. The small product office team cut overhead costs but caused a frightening work load for the PMO personnel. This was due more to cutting 3 months from the original schedule. Had the original plan been executed, the extra three months would have made the work load more

bearable. A one-deep PMO, by definition, is work-intensive. An additional 5 personnel would have improved working conditions immensely but would have cost more, costs the program could not bear.

11. The cost of operational testing was not included in the original cost estimate for the program. The Operational Test and Evaluation Command (OPTEC) is required to provide funds for its test and evaluation effort. Unfortunately, when OPTEC has a shortfall in funding, the smaller systems (ACAT III & IV) are the first tests to be zeroed out. The PM had to go back to the PEO to request an additional $1.2 million to pay for the IOTE. This was the only additional funding required for the Linebacker program after contract award. Lesson: include the cost of operational test and evaluation in program cost estimates.

12. High level support for the first WRAP program ensured cooperation from the acquisition community. Without that support, Linebacker would not have been successful. Linebacker was rapid acquisition but the PMO had to work within an acquisition community that was anything but rapid. The high level support caused the community to get out of its "business as usual" mode, but only grudgingly. As other WRAP programs are approved, they may not enjoy the same level of support as the first effort. A way must be found to make rapid acquisition the normal way of doing business. This is especially true of the logistic support system. Even though Linebacker required only 8 new stock numbers, it still required a minimum of 29 months to bring support on-line.

13. The program schedule was driven by the TFXXI deadline. This deadline forced maximum concurrency in the schedule. Production hardware arrived at the assembly line just in time and, sometimes, not in time. Production hardware design had to be "locked" prior to completion of

testing. Insufficient time was allotted for "burn-in" of the electronics in the systems. Operator training took place too soon after production and operational testing began before production and fielding of the second platoon was complete. Concurrency increases risk as any delay in one area could cause a ripple effect throughout the program.

Summary

The Bradley-Linebacker, as the first WRAP program, was an unqualified success. In only two years, a Line-of-Sight, Forward, Heavy (LOS-F-H) air defense system was fielded using the WRAP process. This is an accomplishment the Army has attempted and failed numerous times in the last 25 years, spending billions of dollars in the effort. The WRAP process, with its support of rapid acquisition concepts, acquisition reform initiatives and streamlined decision-making process, enabled the acquisition community to establish a new standard.

The first WRAP program has shown that battle lab successes can be transitioned smoothly to acquisition programs and fielded rapidly to the force. This will enable the Army to quickly identify initiatives that add significant capabilities and rapidly put them in the hands of the Warfighter. This process will allow the Army to quickly field the successful initiatives resulting from TFXXI. The Wrap process is the method the Army will use and the Bradley-Linebacker program has successfully shown the way.

[i] *US Army devises Revolutionary Acquisition Plan*, Defense News, October 14-20, 1996, p8.
[ii] Ibid.
[iii] TRADOC Regulation 11.1
[iv] Army Memorandum , ASARD, 25 Oct 94.
[v] Ibid.
[vi] *Experiment: Two revolutions in one,* Army Times, April 7, 1997, p26.
[vii] Army Memorandum , ASARD, 25 Oct 94.

[viii] TRADOC Information Paper, 21 March 1997.
[ix] Draft Army Concept Paper - - Army XXI Acquisition Reform (AR) Reinvention Center, ASARDA. 9 April 1996, p1.

Annex B
Operational Requirements for BSFV-E

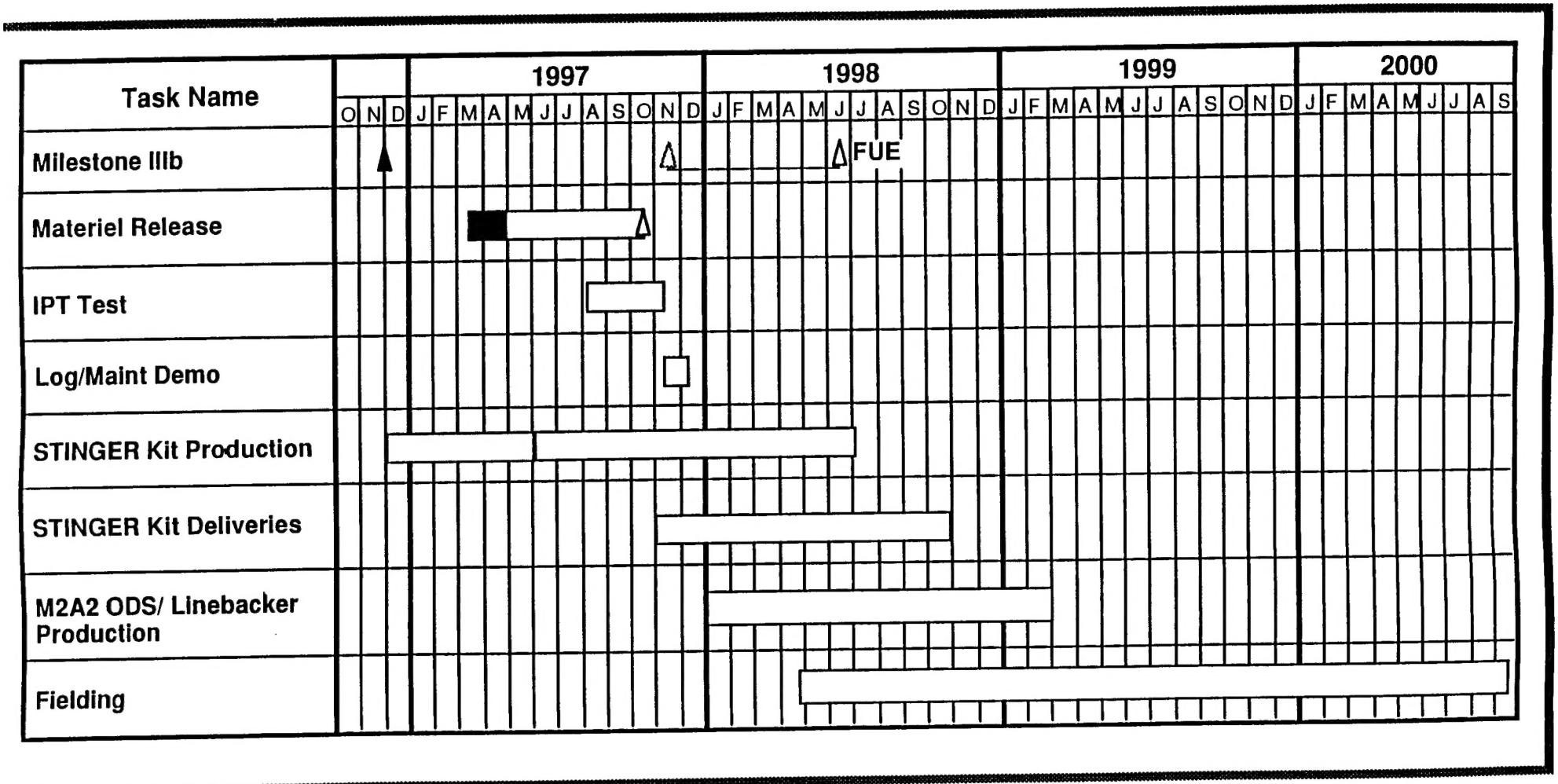
Required Capabilities

- Crew is capable of engaging aerial targets from inside BFV
- 4 Ready-to-Fire STINGER Missiles in external Launcher
- STINGER sighting reticle
- Must interface with FAADC3I
- Voice communications
- Ground situational awareness
- Crew of 4, no additional MOS
- Survivability equal to M2A2 BFV
- Not degrade performance or reliability levels of BFV and STINGER
- Retain man-portable capability of STINGER Missile
- No new institutional training courses
- Capability to include further upgrades of BFV
- No new maintenance support equipment
- Force-On-Force Trainer (FOFT)

Desired Capabilities

- Armor protection for STINGER launcher
- Target ranging capability
- Identification Friend or Foe (IFF)
- Slew-To-Cue (STC) capability
  - Azimuth and elevation
  - Operate on the move
  - Automated and manual
- Shoot on the move
- Embedded Force-on-Force training capability

Annex C : BSFV-E Program Schedule



Doesn't include all Acronyms

ACRONYMS and ABBREVIATIONS

ACM	Advanced Concept Manager
ADA	Air Defense Artillery
ADCCS	Air Defense Command and Control Systems
ADL	Air Defense Laboratory
AMSAA	Army Materiel Systems Analysis Activity
ARL	Army Research Laboratory
AWE	Advanced Warfighting Experiments
BDE	Brigade
BFV	Bradley Fighting Vehicle
BLEP	Battle Lab Experiment Plan
BN	Battalion
BSFV-MUA	Bradley STINGER Fighting Vehicle-MANPADS Under Armor
BSFV-E	Bradley STINGER Fighting Vehicle-Enhanced
BTT	Battlefield Technology Team
CECOM	US Army Communications and Electronics Command
CG	Commanding General
CLS	Contractor Logistics Support
COEA	Cost and Operational Effectiveness Analysis
COTS	Commercial-off-the-shelf
DCD	Director of Combat Development
DIS	Distributed Interactive Simulation
DUSA-OR	Deputy Under Secretary of the Army for Operations Research
EPLRS	Enhanced Position Location Reporting System
EXFOR	Experimental Forces
FAAD C^3I	Forward Area Air Defense Command, Control, Communications and Intelligence
FAADS	Forward Area Air Defense System
FP1	Force Package 1
FUE	First Unit Equipped
GBS	Ground Based Sensor
GEN	General
GFE	Government Furnished Equipment
GPS	Global Positioning System

ILS	Integrated Logistics Support
IPT	Integrated Product Team
ISU	Integrated Sight Unit
LAV-AD	Light Armored Vehicle - Air Defense
LOS-F-H	Line of Sight-Forward-Heavy
LTC	Lieutenant Colonel
MANPADS	Manportable Air Defense System
MANPRINT	Manpower and Personnel Integration
MG	Major General
MILES	Multiple Integrated Laser Effects System
RDEC	Research, Development, and Engineering Center
MWO	Modification Work Order
NTC	National Training Center
ODS	Operation Desert Storm
OPFOR	Opposition Forces
OPTEC	US Army Operational Test and Evaluation Command
ORD	Operational Requirements Document
OSD	Office of the Secretary of the Defense
PEO-TM	Program Executive Office/Officer-Tactical Missiles
PLGR	Precision Lightweight GPS Receiver
PM-ADCCS	Project Manager, Air Defense Command and Control Systems
PM-BFVS	Project Manager, Bradley Fighting Vehicle Systems
PMO	Project Management Office (or Program Office)
RDTE	Research, Development, Test, and Evaluation
SHTU	Simplified Handheld Terminal Unit
SINCGARS	Single Channel Ground and Airborne Radio System
STRICOM	US Army Simulation, Training, and Instrumentation Command
SVML	Standard Vehicle Mounted Launcher
SWA	Southwest Asia
SWG	Simulation Working Group
TDP	Technical Data Package
TECOM	US Army Test and Evaluation Command
TEMP	Test and Evaluation Master Plan
TFXXI	Task Force XXI
TOW	Tube-launched, Optically-tracked, Wire-guided missile
TRADOC	US Army Training and Doctrine Command
TTP	Tactics, Techniques, and Procedures